

# MICROGRIDS IN UTAH

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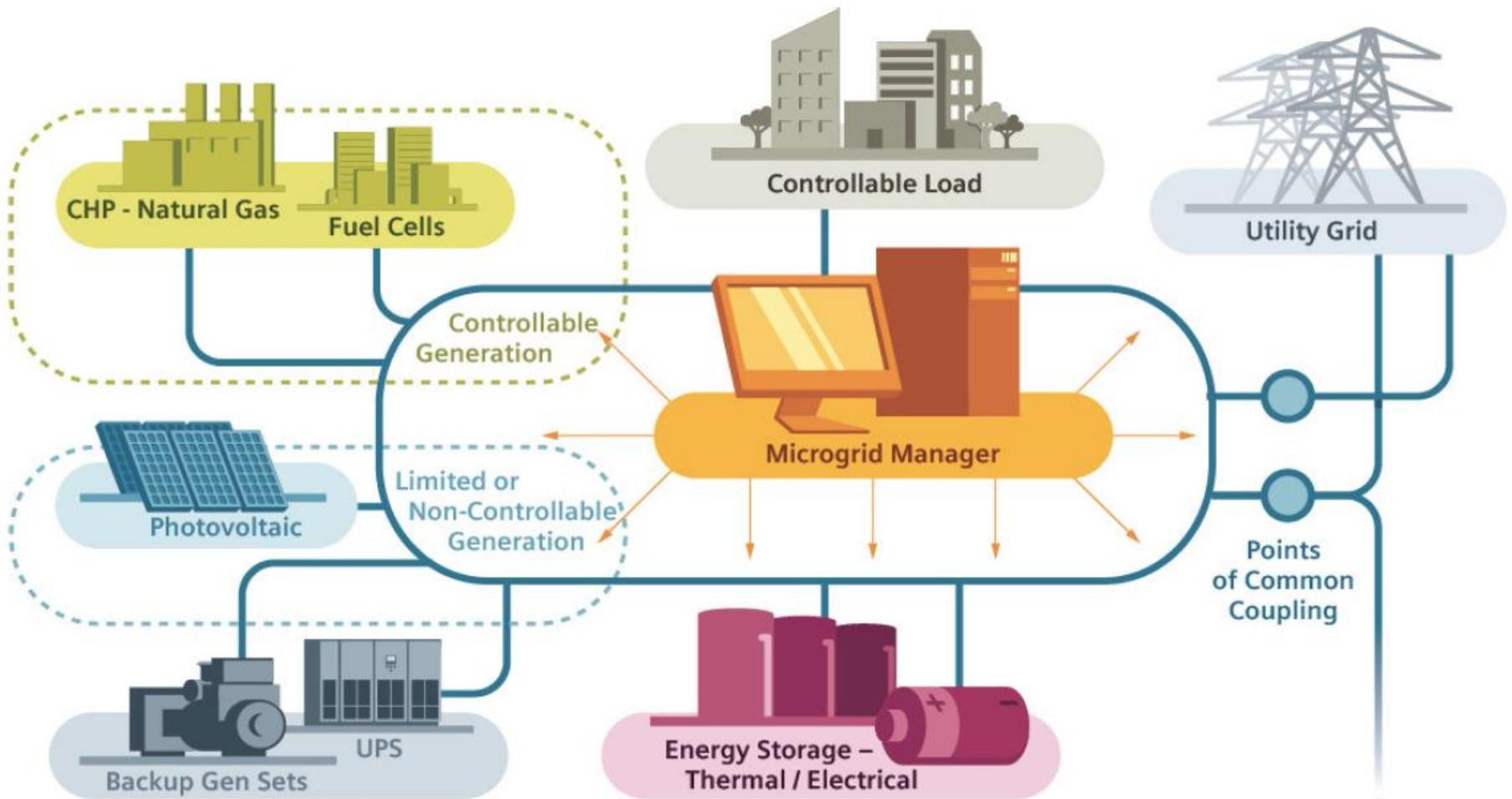
HEAL Utah

# What are Microgrids?

“a group of interconnected loads and distributed energy resources within **clearly defined electrical boundaries** that acts as a single controllable entity with respect to the grid, and that connects and disconnects from such grid to enable it to operate in both grid-connected or island mode.”

Holistic approach to planning that accounts for both current and future interdependencies across technology, regulation, policy, economics, and customer demands

**FIGURE 1: An Example of a Microgrid**



Elements of a microgrid could include: controllable generation like natural gas-fueled combined heat and power (CHP) and fuel cells; limited or non-controllable generation like a photovoltaic solar array or wind turbine (not shown); backup generators, uninterruptible power supply (UPS), and energy storage capability. Loads will vary significantly. The microgrid manager (at the center of the diagram) balances generation and load. The microgrid interacts with the macrogrid through the points of common coupling.

Source: Siemens, "Microgrid Solutions" 2016. Available at: <https://w3.usa.siemens.com/smartgrid/us/en/microgrid/pages/microgrids.aspx>

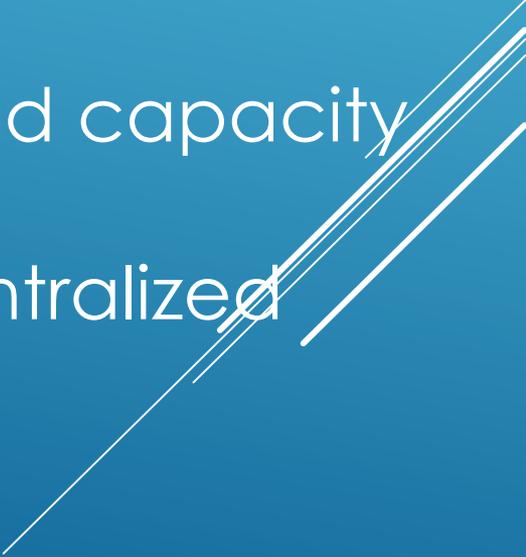
# BENEFITS

## Economic

- Allows “energy choice” without deregulation
- Supports development of energy storage and smart-grid technologies
- Provides retail options for mid-size customers who may want to buy from renewable sources
- Provides additional source of revenue for industry/business, e.g. by leasing their roof for solar panels
- Supports growth of renewable energy industry

# BENEFITS

## Grid

- Risk mitigation, e.g. natural disasters or other grid interruptions
  - A reliable, dispatchable energy source
  - Can integrate or segregate from the main grid, providing stability
  - Decrease peak and base-load capacity needs
  - Blends centralized and decentralized control and management
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- A decorative graphic consisting of several parallel white lines of varying lengths and orientations, located in the bottom right corner of the slide.

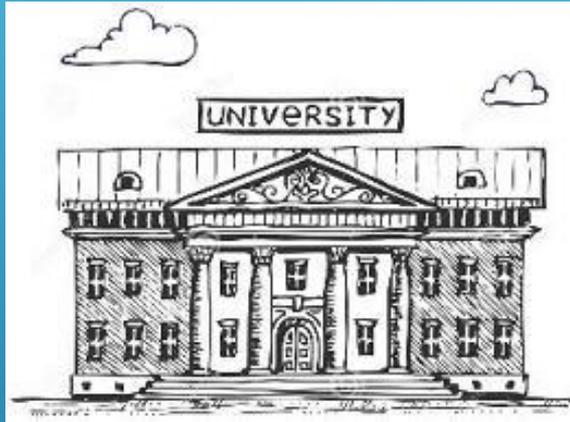
# BENEFITS

## Environmental

- Supports renewable energy growth
    - Reduces greenhouse gas emissions, leading to less volatile climate
  - Supports population growth with reduced environmental impact
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# Types of microgrids

Universities/campuses



Critical infrastructure

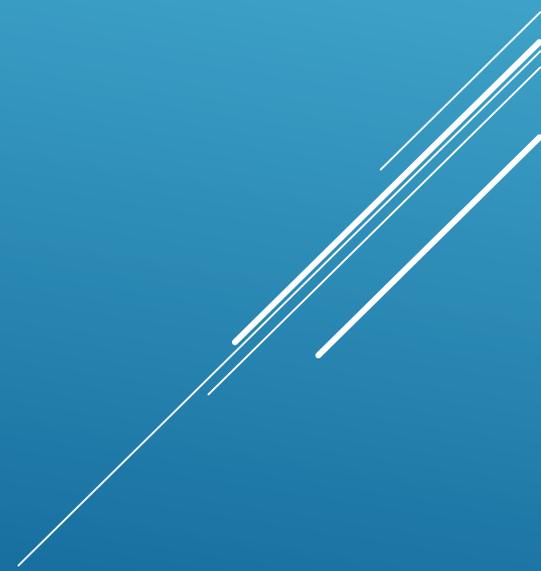


Municipalities



- ▶ Does the microgrid rely on the distribution or transmission system for backup, and how does that impact reliability?
- ▶ Where could or should microgrids be located and developed?
- ▶ How are the costs of microgrid development allocated and recovered?
- ▶ Are the entities that own and operate microgrids (assuming they are not the incumbent utility) public utilities in the traditional sense?
- ▶ Safety issues for electrical workers.

CHALLENGES MOVING  
FORWARD



# Questions?

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